

Women and Infant Nutrition Field Support Project (WINS)

**A Feasibility Analysis and
Business Plan for a Study Testing of
the Efficacy of a New Weaning Food
in Lagos, Nigeria**

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ABBREVIATIONS

AID	United States Agency for International Development
EDC	Education Development Center, Inc.
FIIRO	Federal Institute of Industrial Research, Oshodi
GON	Government of Nigeria
LUTH	Lagos University Teaching Hospital
NCFN	National Commission on Food and Nutrition
Temitope	Temitope Bakery & Catering Services
Tufts	Tufts University School of Nutrition
UNILAG	University of Lagos
UNILAG Consult	University of Lagos Consulting Team
WINS	Women and Infant Nutrition Field Support Project

PERSONNEL AND AFFILIATIONS

Aina, Florence, Ph.D.	Private Consultant
Aina, Tade Akin, Ph.D.	University of Lagos
Coates, Ellen A., M.P.H.	Tufts University School of Nutrition
Dosumu, Bunmi	U.S. Agency for International Development, Lagos
Gershoff, Stanley, Ph.D.	Tufts University School of Nutrition
Grange, Nike, M.D.	UNILAG, Lagos University Teaching Hospital
Kupoluyi, Christine	Federal Institute of Industrial Research, Oshodi
Ogunyanwo, Tim	Temitope Bakery & Catering Services, General Manger
Ogunyanwo, Chief XXX	Temitope Bakery & Catering Services, Chairman, Managing Director
Sampson, Amy, Ph.D.	Tufts University School of Nutrition
Somorin, Oyin	Nigerian Food and Drug Administration, Biochemist, Public Analyst
Soyombo, Lolu, Ph.D.	University of Lagos
Zeitlin, Marian, Ph.D.	Tufts University School of Nutrition

EXECUTIVE SUMMARY

This report summarizes a working visit to Lagos, Nigeria made in January, 1993 by a WINS Project Team composed of Dean Stanley Gershoff, Dr. Amy Sampson, and Ellen Coates, M.P.H., all of the Tufts University School of Nutrition. This trip served as a follow-up to an initial WINS/SUSTAIN - sponsored visit to Lagos made in October, 1991 by Dr. Marian Zeitlin, Dr. Amy Sampson, and SUSTAIN representatives, who investigated potential WINS projects in Nigeria. During that trip, owners of a local Nigerian baking firm (Temitope Baking Industries, Ltd.) indicated their interest in working with WINS to pursue an infant weaning food venture involving marketing and distribution of a low-cost nutritious weaning food in the low-income marketplaces of metropolitan Lagos. The purpose of this second WINS visit was to conduct a feasibility analysis of the proposed weaning food project, develop a business plan and study protocol, and identify future staffing requirements. Following a positive feasibility analysis and successful completion of a business plan and study protocol, mechanisms were identified for the provision and accounting of all in country project staff and expenses.

As discussed by Drs. Zeitlin and Sampson in the "WINS Proposal to Manufacture and Market a Nutritious Low-Cost Weaning Food in Nigeria," dated December 29, 1992, Nigeria's overall rates of wasting and stunting are reportedly among the worst in Africa. Over-reliance on traditional weaning foods, primarily gruels of maize or sorghum, has been implicated in the widespread undernutrition of weaning age Nigerian children. These lost-cost, low-protein weaning foods do not provide adequate amounts of the key nutrients required for optimal growth and development after the age of four to six months, when breast milk, although dense in nutrients, no longer supplies adequate nutrition to growing children. As a result, the rapid growth rate documented in Nigerian children under the age of four to six months falters dramatically at this age. The current nutrition status of weaning age children, available weaning foods, and potentially viable interventions are reviewed by Drs. Zeitlin and Sampson in their 1992 report. The current project will test the hypothesis that a highly nutritious, culturally acceptable weaning food can be manufactured and made available to low-income mothers in single serving packets at low-cost, and that use of this product will improve the nutritional status and growth rate of weaning age children.

The first objective of the January visit to Lagos was to ascertain the viability of sustained manufacture and marketing of the proposed weaning food. The WINS team worked in collaboration with Chief Oggunyanwo, the owner of Temitope Bakery and Catering Services, Ltd., Tim Oggunyanwo, General Manager of that company, and an independent Nigerian financial analyst, to project costs and estimate potential sales and income during the life of the project the first year of business following completion of the project, after US support has been withdrawn. The completed projections indicate that the proposed weaning food venture is economically feasible and sustainable. In addition, the WINS team visited the AID mission in Lagos to discuss the proposed project in relation to AID objectives and activities in the Lagos area; respond to any AID concerns; and ascertain AID Mission approval for the project.

The Tufts and UNILAG personnel met several times to discuss the proposed nutritional impact study and develop study protocols, the second objective of the visit. Appropriate sites, populations, instruments and the administrative and investigative procedures to be utilized during the study were defined. A local biochemist and representatives of a pharmaceutical/vitamin supply company were consulted regarding quality control mechanisms to be applied to the weaning food product. Finally, additional staffing requirements including data collectors, community workers, community vendor/educators and marketing and advertising consultants were identified, and their responsibilities and tentative remuneration levels were established.

I. INTRODUCTION

Based on the information gathered by Drs. Marian Zeitlin and Amy Sampson during a WINS/SUSTAIN-sponsored visit to Nigeria in October 1991 it was determined that a low-cost, nutritious weaning food made available to low-income mothers in local marketplaces could be an effective intervention to combat malnutrition among weaning age children in Nigeria. In January 1993, a WINS project team from Tufts University School of Nutrition visited Lagos, Nigeria to investigate the viability of a weaning food venture proposed in 1991 by Temitope Baking Industries, Ltd. of Nigeria. During this visit, the WINS team collaborated with Temitope personnel and a Nigerian financial analyst to explore the potential for a financially feasible and sustainable weaning food venture and develop a realistic business and financial plan. The WINS Team and members of UNILAG designed a nutritional impact study to test the hypothesis that the proposed weaning food product will improve infant nutrition in a low-income population. Planning was also begun for a market survey and analysis to be conducted later in the year, in a region of Nigeria geographically removed from the nutrition study site.

II. FINANCIALLY FEASIBILITY ANALYSIS

The WINS Project Team members worked closely with Mr. Francis Bello, a Nigerian financial analyst recommended by the UNILAG Team, and with Chief Ogunyanwo, owner of Temitope Bakery and Catering Services, Ltd., (hereinafter "Temitope"), Tim Ogunyanwo, General Manager of Temitope, and Moses Adedapo, the Temitope Accountant, to assess the capital costs still to be incurred and the expected costs of the proposed nutritional impact and product marketability studies; project a break-even point for Temitope; and evaluate the sustainability of the weaning food manufacturing venture. Unfortunately, Mr. Bello's experience did not lend itself well to the needs of this particular analysis and the Team was unable to complete the final analysis prior to departure from Nigeria, despite the fact that Dr. Sampson delayed her departure from January 22 to January 26 in order to work intensively with the Temitope General Manager and Accountant for several extra days. Dr. Sampson and Mr. David Hastings, also of the Tufts University School of Nutrition, completed a financial report (Appendix A) in February. This final report is based on information gathered during numerous meetings and inquiries conducted in Nigeria, and subsequent telephone calls made from Tufts University to Temitope. An unanticipated advantage to the delay lies in the fact that the information contained in the final report reflects the significant increases in costs of raw materials which occurred in late January and early February and were reported to Dr. Sampson and Mr. Hastings during their telephone calls. Conservative estimates were used to project costs and plan activities in order to compensate for the constantly fluctuating costs of goods and services in Nigeria. The built-in flexible profit margin for Temitope will ensure that the new weaning food will remain both a profitable venture for the company, and an affordable product for the low-income consumer.

For the purposes of the financial analysis and business plan, the project was divided into three phases: 1) Product Research and Development, 2) Nutritional Impact Study, and 3) Product Marketability Study. WINS funding will be used for aspects of each phase, along with funding from Temitope. Following successful completion of the nutritional impact study and market analysis, US financial support will be withdrawn, and it is expected that Temitope will maintain the weaning food business independently, expanding production and marketing the weaning food throughout Nigeria.

On numerous occasions during their trip, the Tufts and UNILAG Teams visited the Temitope Factory at Sagamu, the biochemist's office and laboratory in Lagos, and supply companies including the vitamin mix distributor to assess future needs and estimate costs. The company expended funds to improve the factor, renovate its equipment and implement additional hygiene regulations, as noted in the financial report. Capital costs for further necessary upgrades are incorporated in the projected expenses relating to weaning food production. The Team determined the quantity of product required for the Nutritional Impact and Market Analysis studies and calculated anticipated expenditures for raw ingredients, the vitamin mix, wages and salaries for factory staff for time devoted to production of the weaning food, as well as an appropriate percentage of factory overhead. In addition to the accountant and the General Manager of the business, Chief Ogunyanwo, owner of the company and President of the Bakers' Association of Nigeria also contributed extensively to the discussions and to short and long-term projections of costs and market availability of raw ingredients. Given the uncertain availability of raw ingredients such as soya flour, information on alternatives which may be used is also provided in the analysis (Appendix A).

Additional staff will be hired to ensure and maintain the high quality of the weaning food, including a quality control expert to oversee actual production, a biochemist to monitor nutrient content, and additional factory workers to be hired when the company shifts to full-scale production of the weaning food. These positions are described in the financial analysis and business plan. The cost of obtaining product approval from the NFDA. In addition, projected costs for the expanded production and distribution scheduled to occur during the market analysis phase are included in the complete financial report, along with salary for a marketing specialist and an advertising consultant.

During meetings with the Temitope executives and accountant, the production costs, as well as the costs of delivery, distribution and vendor fees were used to calculate the expected market price of single serving sachets of the weaning food. With the assistance of the financial analyst, projected monthly outlay and income for the factory during each phase of the project and at full capacity production were calculated to estimate when the company could expect to reach a break-even point and begin to realize financial return on their investment.

The below-listed costs of packaging, labeling, advertising and educational brochures include the costs of hiring a local graphic artist and Nigerian health experts to assist with development of culturally appropriate instructions and health education messages which will accompany the product. Local health expert(s) who will assist the project staff in accessing the study

communities, delivering appropriate health messages to vendors and study participants, and monitoring the health of the babies in the study were identified and appropriate payment scales were determined based on the past experience and advice of the UNILAG researchers involved in the Project. Finally, travel time and salaries for further involvement of Tufts University personnel in the study are incorporated in the financial report.

III. NUTRITIONAL IMPACT STUDY

The proposed project includes a longitudinal anthropometric study intended to evaluate the nutritional impact of the new weaning food on infants of the weaning age, specifically infants 6 months of age and older. Two groups of eighty children each from two geographically distinct marketplace communities will be identified and enrolled in the study. Participants from the control group will receive appropriate gifts, while participants in the test group will receive the same gifts and daily servings of the weaning food. Over the course of seven months anthropometric data will be collected from both groups on a regular basis and then analyzed using standard statistical tests.

The Tufts University Team and Drs. Aina and Soyombo of UNILAG met throughout the course of the January visit to determine staffing requirements for the nutrition study, discuss site and participant selection criteria and develop testing protocols and instruments.

A. PERSONNEL

In-country project team members include individuals with affiliations from Nigerian public and private institutions and organizations including UNILAG, the National Commission on Food and Nutrition (NCFN), the Federal Institute of Industrial Research Oshodi (FIRO), and the Nigerian Food and Drug Administration (NFDA). The core in-country project staff have been identified. These include the Project Director, Associate Project Director, Administrative Assistant, Driver, Field Coordinator, Graphic Artist, Biochemist, and Health Specialist. At the time of the WINS Team's departure the following positions were yet to be filled: 4 data collectors from a pool of qualified UNILAG students and professionals, 8 community-based workers to be identified from the Nutritional Impact Study target communities, 4 vendor/educators to be identified within the market analysis communities, and one marketing and one advertising consultant to be hired by Temitope in mid-March, 1993.

Verbal agreements were made with available Team members while the WINS team was in Nigeria. Since the WINS team's return to the U.S., contractual agreements have been sent to Nigeria via DHL. These are to be completed and returned to Tufts in early March. All other forms required for payment of salaries, reimbursements, purchases, etc. (i.e. consultant forms, invoices, etc.) were left in Nigeria with instructions for their completion. The Team's numerous attempt to establish a relationship with a local bank and mechanisms for payment were unsuccessful. Therefore, all core Nigerian project personnel have yet to be remunerated for their work on the Project during and after the January visit. In the interests of expediting

reimbursements, the following temporary arrangements have been made:

Upon receipt of all necessary documentation (i.e. forms and paid invoices), project material and labor costs will be reimbursed through direct wire transfer to; a) a bank account monitored by the in-country Project Director; or, b) a bank account through which payments will be made to Temitope (possibly arranged through the agricultural counselor at the U.S. Embassy).

The revised budget lists the individuals to be reimbursed, the amount of reimbursement required, expected remaining expenses and the dates those expenses are expected to be incurred. Details of both temporary payment solutions and eventual pay scales to be followed, as well as equipment and supply costs for this phase of the project, are found in Appendix A.

B. METHODOLOGY

1. Impact Study Site Selection

Rather than recruiting the research study groups from large market places as originally proposed, it has been decided that recruitment will take place in specific communities. Since residential communities in and around Lagos utilize their own specific local marketplaces, study participants will be recruited from not only mother's place of employment but their place of residence as well. This should simplify follow-up data collection visits and decrease study participant attrition.

Two of four communities within a one hour drive to the University of Lagos (UNILAG), possibly one of two on Lagos Mainland and one of two on Lagos Island will be identified. The number of communities selected will depend on the number of eligible study participants available in each community. In March, 1993, in-country staff will begin initial site assessment to determine whether or not 80 children meeting the established study criteria can be selected from one or two communities within each site. Following the recommendations made in January by UNILAG representatives site selection criteria will include; 1) the presence of a sufficient number of families to provide the required number of children; and, 2) the presence of a legally recognized, "vibrant" local marketplace with established vendors and daily activity.

2. Participant Selection

Initial mapping, enumeration and assessment to identify marketplaces, streets and houses where potential subjects will be selected, and to generate lists of potential participants from the community will begin in late March. Identified subjects will be described in terms of their geographic location and individual/family characteristics including socio-economic status, maternal factors, and children's age and level of nourishment at enrollment. Eligible children will reside with their mothers, will have been breastfed, and will have begun the weaning process before the feeding trials begin. Children of multiple births will not be eligible for participation. Other exclusion factors will include malnourishment, chronic illness (i.e. polio,

physical and mental disabilities) and deficient motor coordination. The potential impact of including children with siblings who are also of weaning age, which may effect compliance, will be compared to the impact of excluding those children, which would limit the number of children eligible for enrollment in the study.

Community-based workers (CBWs) will be recruited within the study sites, from among mothers with children in the targeted age groups. Mothers will be selected on the basis of enthusiasm, knowledge, and interest, and will be trained and employed on a part-time basis to assist with data collection and anthropometric measurement. They will also help as agents of mobilization for the dissemination of health education messages. These women will be relatively self-employed, unemployed or temporarily unemployed, and will be of sufficient literacy to understand the project goals and objectives, take and record simple notes, and keep basic records.

3. Data Collection

Study instruments will include a baseline socio-economic survey, and periodic nutritional impact interviews (including a product use and acceptance survey and anthropometric measurements), and health status interviews. Feeding observations, feeding trials and food acceptance tests will be conducted within the test group to ensure appropriate product use. The health status interviews will describe the morbidity histories of children in both the experimental and the control groups. Anthropometric instruments will include standard growth-monitoring devices and scales used to measure various aspects of child development including negative findings such as wasting and stunting. Equipment will include scales, measuring tapes, and measuring boards or other tools to measure length/height. Baseline survey and diet and health questionnaires will be developed by Tufts, UNILAG and FIRO personnel when Dr. Sampson and Ms. Coates return to Nigeria. Any additional instruments deemed necessary to test other physical and/or mental indicators of child development will be utilized as well.

The data collection component of the study will be supervised by Dr. Soyombo and Ms. Coates. Data collectors and CBWs will be trained to use anthropometric measuring devices and record data. Data will be collected on a regular basis by teams of data collectors and CBWs who will turn the data over to Ms. Coates within 48 hours. The data will be entered and reviewed and growth charts will be completed. Where there are significant discrepancies in data or evidence of significant growth-faltering, appropriate follow-up measures will be taken. Basic statistical analysis will be on-going, while more in-depth analysis using SPSS software will take place in November and December, following approximately 7 months of data collection. Tufts and UNILAG personnel will work closely together on all data analysis and reporting. Core personnel and the data collection teams will meet on a weekly, and then bi-weekly basis for debriefing, problem solving, and reenforcement of skills. Meeting minutes and progress reports will be drafted and provided to appropriate personnel in Nigeria and the U.S. on a regularly scheduled basis.

4. Quality Control

The Team addressed quality control concerns pertaining to data collection and analysis and to production and distribution of the weaning food itself. Consumer testing of the product and health messages to be used will occur prior to the feeding trials and market analysis, and the weaning food will be certified by the NFDA before it is distributed.

Dr. Soyombo and Mrs. Kupoluyi (FIIRO) will oversee recruitment and training of the data collectors and CBWs and will monitor the data collection process. Ms Coates will input data from the field as soon as it is received, and will run and review basic statistical analyses for possible errors and for potential technical knock-outs. Any enrollees showing faltering in growth or health or signs of other causes for medical concern will be referred to Dr. Nike Grange, a pediatrician at the Lagos University Teaching Hospital (LUTH). Where measurement error is suspected, the family will be revisited and measurement retaken as soon as possible. During the first weeks of testing, weekly staff meetings with Team members and data collection staff will provide opportunities to reenforce training and health messages, air questions and concerns, and address any problems that may develop. Later in the course of the testing phase these meetings may occur on a bi-weekly rather than weekly basis. Data collectors will also have the opportunity to voice any questions or concerns they may have when they turn in their data to Ms. Coates following each day spent in the field.

Data collectors, CBWs, and the vendor/educators who will be involved in the market analysis phase of the project will be trained and educational brochures will be produced to ensure that appropriate instructions and health and hygiene messages are provided to the community members using the Temitope weaning food. It is expected that vendor education and distribution of appropriate instructions and educational messages will be continued by the Temitope management after the project is completed and U.S. support is withdrawn.

In addition to measurers taken at the Temitope factory to ensure that the weaning food produced will be of consistently high quality and meet health and hygiene standards, samples of the product will be sent to Dr. Somorin for biochemical analysis. Samples will be collected both on a regular basis and on unscheduled occasions. The vitamin mix purchased for use in the product will also be tested periodically. Ms. Coates and other Team members will visit the factory to collect samples and to check hygiene and other quality control measures applied to the factory equipment and employees.

IV. REPORTING PROCEDURES

A. BUDGET

Prior to the WINS team's January trip, Mr. Hastings prepared documents detailing project accounting procedures. This body of documents which accompanied the WINS team to Nigeria contained all necessary forms and examples of how each should be filled out. Ledgers and

receipt books were also supplied. Detailed instructions were left at the UNILAG office with the project Administrative Assistant.

B. ADMINISTRATION

The following steps have been proposed:

1. A weekly meeting attended by all 8 data collectors, the Field Supervisors, Ms. Coates and the Administrative Assistant will be held in the UNILAG Project Office. The Associate Project Director will attend the weekly meetings as often as his schedule permits. When possible, these weekly meetings will take place on Friday mornings from 8 to 12. Extensive minutes will be recorded during the meetings and will be delivered to the Project Director for his review immediately preceding the completion of the meetings.

The primary objectives of these weekly meetings are: to plan strategies for future project implementation; to review project progress in terms of task accomplishments; to discuss the relationship between required tasks and the project time schedule; to debrief project staff and data collectors; and, to review quality control measures. Quality control measures to optimize consistency among the data collectors will include review of data collection methods including participant contact and compliance, data collection techniques (interviewing and measurement skills), and data recording procedures. These meetings should and with an open informal discussion so that data collectors will feel comfortable enough to discuss any current or potential problems or concerns they may have. Following the Project Director's review, a copy of the weekly minutes will be sent to Dr. Amy Sampson at Tufts and a copy will be maintained in the Project Office Files.

Monthly meetings will be held with all project team members and the Temitope weaning food project team. These meetings will be held at UNILAG. Prior to the monthly meetings all participants will be requested to submit any items to be discussed to either Ms. Coates or the Administrative Assistant. All project team members are required to attend the monthly meetings and be prepared to supply other personnel with verbal progress reports. Detailed minutes will be taken at these meetings and copies will be provided to all team members. A copy of the meeting minutes will be sent to Dr. Amy Sampson at Tufts University.

C. DATA ENTRY STRATEGIES

All primary data collected will be brought to the UNILAG office as soon as possible for review and immediate entry. When possible, data collectors will make their survey forms and measurements available for review at UNILAG within 24 hours of collection. All data collectors will be required to keep logs of their appointments. Ms. Coates will review all data collection forms and notes with the collector who gathered them, code the data, and enter all data on the personal computer located at the UNILAG project office.

D. ADDITIONAL REPORTING PROCEDURES

All of the following reports will be submitted to the Project Director for his review. All reports should be ready for review and discussion by the 10th of the month after the reported month.

- Monthly Data Collection Progress Reports: written by Ms. Coates and Mrs. Kupoluyi.
- Monthly Status Reports of Day to Day Activities: recorded by Ms. Coates.
- Monthly Community Field Reports: compiled by Mrs. Kupoluyi and Ms. Coates.
- Focus Group Reports: prepared by Dr. Florence Aina and collated by the Administrative Assistant.
- Monthly Financial Activity Reports: prepared by Ms. Coates and the Administrative Assistant.
- Quarterly Project Progress Reports: prepared by the Associate Project Director, and Ms. Coates and submitted to Dr. Amy Sampson at Tufts.

V. PROJECT PROTOCOLS

A. NUTRITIONAL TESTING

Following numerous meetings of team members and in-depth discussions of the biochemical and nutritional factors related to the weaning food venture, a final nutritional testing protocol was developed by Dr. Gershoff which would satisfy both the WINS Project needs and remain within the budgetary limits. The biochemist selected for the project is currently a UNILAG staffmember, the public analyst for the FDA, and has in the past conducted analysis for Temitope. The WINS team members toured the testing facility where much of the biochemical analysis will take place, and discussed outside facilities which could be used if necessary.

B. CONSUMER TESTING

Members of the community in and surrounding Sagamu who have weaning age children will participate in the consumer testing trials. This will include testing both the organoleptic qualities and cultural acceptability of the proposed weaning food recipes and the appropriateness of the proposed packaging and labeling information. Though Temitope has conducted its own in-house and limited marketplace consumer testing of proposed weaning food recipes and labeling, it has been decided that Temitope will hire a consumer testing/marketing specialist to oversee future consumer trials which will take place for the duration of WINS involvement. This will ensure that the future consumer trials will be conducted in a scientific manner and that the methodology

and results will be documented. In addition to Temitope Management and the hired marketing consultant, WINS core project staff including the Associate Project Director and the Field Supervisor will be involved in the consumer trials. They will review all proposed consumer testing methods prior to use; be present at and assist with both consumer trials and any related focus group discussions; and be responsible for the final review of the consumer trial result report. Though numerous discussions took place with regards to consumer testing protocol while the WINS team was in Nigeria, no final written protocol was developed prior to the WINS team departure. It is expected that final written consumer testing protocol will be developed and executed by the end of March 1993.

C. MARKET TESTING

As detailed in the Financial Plans, Temitope will begin 20% production and distribution of the weaning food in June 1993. Currently there are 15 distributors located throughout the country. Market Testing will be restricted to areas which will be geographically isolated from the nutrition study sites to preserve the integrity of the randomized controlled trial. The following factors will contribute to the selection of market testing sites:

1. One of the primary goals of this project is to increase the incomes of women working as vendors in local markets throughout Nigeria. It has therefore been decided to focus on areas of the country where women are the primary market vendors.
2. This component of the project is intended to monitor the market trends in the market test site for a six month period. It is critical that the market test site be geographically as far removed from the nutritional impact study sites as possible without making travel for data collection logistically impossible. Various market test options are being examined, and the following points must be considered:
 - a) Since all preliminary product development research has taken place in areas of Nigeria where the population is predominately Yoruba, it would make sense to test market the product first in areas which Yoruba is the primary culture. Given the large Yoruba population in Southern Nigeria this should not be a problem.
 - b) The test market sites must be isolated sufficiently in terms of advertising range (T.V., radio, newspaper) from the nutritional impact study control site.
 - c) The number of vendors selling the new product and the amount, they are expected to sell monthly must reflect a realistic sales level. For example, spreading the 20% production across to many markets may assure that all of the product sells, but will not provide an accurate assessment of the test marketing and advertising impact. Given the number of vendors in the marketplaces served by each Temitope distributor, it is projected that the entire amount of test packets could be sold without difficulty with only a half dozen or so distributors. This approach will not allow for suitable testing of health and advertising messages,

nor give Temitope an idea of how they will be received at higher production level. Therefore it has been decided that in order to test market the product more effectively and to minimize the risk of slippage back into Lagos nutritional impact study sites only one to three markets will be targeted for product introduction. The sites to be selected will be determined in late April-early May after preliminary data is collected which will provide the information necessary to make the decision.

- d) The data collection team must be able to visit the test market sites at least 4 times during the 6 month study period. Four sales vendors will be hired in the study sites (see contracts for job descriptions). Temitope is confident in the dedication and abilities of their sales distributors who will assist in test market site selection and monitoring. The company is willing to supplement their current sales staff by hiring 3 additional employees whose sole jobs will be to provide support to the weaning food venture. The Temitope sales distributors, hired sales vendors, and the project data collection team will work collaboratively in the collection of ongoing market data.

The Market Study team will spend the month of May focusing on the development of data collection tools (questionnaires, sales volume report forms...) to be used throughout the test marketing period. In early May, detailed information will be collected in the study market sites. The selected market will be mapped out and sales/trade information will be collected from women who sell Temitope products of baby foods there. This information will be used to compare and track product sales progress during the 6 month trial sales marketing. In May it will be decided whether recruitment for weaning food sales will be limited to currently established Temitope sales vendors, or expanded to include non-Temitope vendors currently selling baby food products. The sales vendor/educators will be hired at this time. During focus groups, these women and their friends will examine factors which could possibly affect either sales or monitoring. Periodically throughout the six month test market period, the project data collection team members will visit both the distributor and the study markets to survey product acceptability. They will also assess the success of marketing strategies by:

- 1) monitoring the ongoing market viability of the product;
- 2) developing written profiles of the consumers;
- 3) assessing the success of the health education and product use messages presented in the pamphlets distributed with the product by determining the extent to which the messages are understood and followed correctly;
- 4) comparing the relative impact of different advertising techniques; and,

- 5) examining the selling practices of the sales vendors in relation to the training provided by the project team, and determining whether or not appropriate product and health related messages can be successfully disseminated through vendor channels.

APPENDIX A

TEMITOPE BUSINESS PLANS

INTRODUCTION

This summary presents the financial analysis and strategic business plans for the development, manufacture and test marketing of a nutritious, low-cost, single serving weaning food. The manufacturer, Temitope Biscuit Industries, Ltd. is a privately owned firm based in the city of Sagamu, in the Ogun State of Nigeria. Nigerian and United States technical assistance is being provided to Temitope through the United States Agency for International Development's (USAID) Women Infant Nutrition Support project (WINS). The financial projections included in this written report and displayed graphically on the attached spread sheet estimate the point at which the new weaning food product should achieve market sustainability given the current (February 1993) pricing structure.

Temitope's direct involvement with WINS in this weaning food venture can be divided into the following three phases:

1) Product Research and Development, 2) Nutritional Impact Study, and 3) Product Marketability Study. When WINS involvement ends, it is expected that Temitope will independently expand its weaning food production and marketing to geographic areas outside of the test market sites.

RESEARCH AND DEVELOPMENT (1/93-4/93)

It is during the research and development (R&D) phase of the project that Temitope has to date and will continue to invest a substantial portion of its own resources. Though on paper the WINS Weaning Food Project R&D began in January of 1993, Temitope has independently spent both personnel and monetary resources exploring the weaning food venture since the WINS October, 1991 visit. Though the 1991 WINS visit stimulated Temitope's investigation into the weaning food venture, it was clearly stated that until final project approval (pending a positive 1/93 feasibility analysis of the sustainability of the venture) Temitope would be responsible for any resource outlays. As a result of the considerable time which has passed between the initial WINS visit in 10/91 and the final project go ahead in 1/93, Temitope has realized a significant portion of non-refundable expenses. A breakdown of the direct cost preliminary expenses (as opposed to in-kind contributions of personnel time or previously purchased raw materials) are contained in the attached projected flow chart (January, 1993).

The weaning food Salary/Wage costs which begin in January 1993 reflect the need for additional engineering personnel time to modify and maintain existing factory equipment; and a quality control engineer to oversee the stringent quality control and sanitation requirements of weaning food production. Beginning in project month 2 (February 1993), Temitope is allocating a percentage of personnel time for a sales marketing manager and two marketing canvassers who will be involved in all aspects of the weaning food venture. As seen in the WINS Project Budget WINS has budgeted a set amount of capital to assist Temitope with the following R&D costs: Vitamin/Minerals, Sanitation Measures, Die Casting, Initial Packaging and Advertising Materials, and Biochemical Testing. In addition to these material costs, WINS will pay a set

amount of Temitope's costs for the services of a biochemist, a graphic artist, and a marketing consultant whose services are deemed necessary for the success of the weaning food venture.

NUTRITIONAL IMPACT STUDY (5/93-11/93)

Following final FDA approval, the nutritional impact of the new product on a population of weaning age children will be scientifically investigated by a WINS team composed of faculty and staff from the University of Lagos (UNILAG) and the Tufts University School of Nutrition. All research study material and personnel costs will be paid for directly by WINS. Temitope will incur no expenses as a result of this research, and their only direct involvement will be to provide at cost the amount of the weaning food needed to conduct the feeding trials. Since the monthly amount of the weaning food which needs to be produced for the nutrition impact research is small as compared to Temitope's total current factory production, Temitope has chosen not to include the percentage of costs for plant operators or packers needed for weaning food production until test marketing production begins in May (for June distribution). Then amount of raw and packaging materials initially purchased for R&D and realized in month 2 will be sufficient to produce the weaning food needed for the nutritional study. Temitope has estimated that they will need to begin repurchasing packaging and raw materials (i.e. fortificants and colorants) beginning in project month 7.

MARKETABILITY STUDY (6/93-11/93)

Temitope will begin to test market the new weaning food in June, 1993 in select study markets. As seen in the attached spread sheet, Temitope will begin to allocate one seven (7) hour shift for the production of the new weaning food (20% production) in May (wage/salary for factory packers and operators). Since there is a 30 day credit period extended to Temitope distributors, sales income resulting from test market sales production is not realized by Temitope until July, 1993.

The sales income is based on the assumption that 80% of the product produced during the test marketing will be purchased.

Since Temitope will not be producing the product in any significant volume until May, they have chosen not to estimate any factory costs prior to May. However, Temitope expects that the addition of significant factory expenses after a couple of months of weaning food production. Some examples of these costs are 1) Some of the existing packaging equipment had to be altered to accommodate the weaning food which is a fine crushed powder. Until Temitope has the capital to invest in the purchase of new machines designed specifically to package powder, the existing machines will have to be flushed to assure that there is no powder build up. Powder build up could significantly compromise sanitation standards as well as jam machinery. There are other addition factory costs which will be necessary to achieve the standards necessary for weaning food production. These include the need for daily factory cleaning, uniform, mask, and glove maintenance, training sessions to assure employee hygiene, etc.

Beginning in May, Temitope will need to spend capital on advertising in preparation of

the initiation of test marketing in June. At the time of initial product introduction, WINS will pay the costs for the production of approximately 500,000 handbills which will accompany the new product in the test market. The costs for the development and pretesting of the health related information contained in the handbills will be covered by WINS during April and May. During test marketing, WINS will employ 4 weaning food vendors to serve as study market vendor/educators. Following the provision of the handbills, Temitope will not receive any additional capital assistance from WINS for the duration of the project. WINS staff will work collaboratively with Temitope employees and the hired vendor/educators to collect test market data for six months following test product introduction.

PRODUCT SUSTAINABILITY

Following WINS involvement in this weaning food venture, it is hoped that Temitope will continue to sell the product at a price affordable to the low-income consumer. Currently it is estimated that Temitope will expand production in January, 1994. However, if market success warrants earlier expansion, the company will do so. The only stipulation, agreed upon by Temitope management, is that any additional product expansion prior to December, 1993 must not interfere with the nutritional impact study.

PRODUCT COSTING

BACKGROUND

The commercially prepared, nutritious weaning foods currently available in Nigeria are sold in 400g tins providing ten 40g servings at a serving cost of between N2.00 and N3.50 per serving. The traditional nutritionally inferior home made weaning foods (such as pap or ogi) cost approximately N1.00 per serving. Temitope is projecting that the new weaning food will be sold in single serving sachets to the consumer at a cost of N1.50 per serving.

ASSUMPTIONS REGARDING PRODUCT COST MARGIN ANALYSIS

Initial cost estimates for product per single serving sachet were based on the January 1993 costs of ingredients and production (materials + 12% overhead). Since the WINS team's return to the U.S. significant changes in some raw ingredient costs have taken place. These changes have resulted in increased production costs. It is likely that as the project proceeds that both raw material and production costs will continue to fluctuate as will the Naira to Dollar ratio. In addition to unpredictable fluctuations in production costs and exchange rates, estimated product loss during production and packaging may decrease, and overhead costs may increase from the current 12% estimate. Taking these factors into account, alternate recipes using a variety of imported and local grains have been investigated and a flexible profit margin per packet to Temitope has been built into the current product pricing structure. The actual profit margin may increase or decrease as production efficiency increases and/or changes in prices

occur. In the event that Temitope's estimated profit margin does substantially increase, the company has been agreed to pass the savings onto the consumer and restructure the margin analysis so that the end result is that the product will be available to the consumer for less than the currently estimated sales price of N1.5 (or equivalent in relation to traditional weaning foods). In the event that the current profit margin decreases due to ingredient or production cost increases, Temitope has agreed that as long as their minimal product sales profit margin is acceptable (right now at approximately N.05 per sachet) they will arrange the distribution pricing structure so that the final selling price to the consumer will not go above N1.5. Thus, given the current pricing structure contained in this report, the price per serving to the consumer should not exceed N1.50 or the equivalent (in relation to other products) for the duration of WINS involvement.

1. SALES INCOME

As aforementioned, until June, 1993, Temitope will not be producing the weaning food for sale. Until production begins in May, 1993, Temitope will only be producing the product for consumer testing, the nutritional impact study feeding trials, and for biochemical testing. Therefore, as seen in the accompanying spread sheet, between January 1993 and July 1993 Temitope will receive no income from product sales. Because of a 30 credit practice, sales income generated in June will not be recognized by Temitope until July 1993. The six month sales income reflected in the flow chart represents Temitope's product sales to the distributor at a price of N1.20k per 40 gram single-serving sachet of weaning food. Monthly production is based on 20% of capacity for six months of operation from June, 1993 - December, 1993.

The calculations for the costs of production follow:

Ingredients	Cost/Kg	Amount in Recipe	Recipe Cost/Ingredient
Corn Flour	6.0000	180.0000	1080.0000
Wheat Flour	9.0000	120.0000	1080.0000
Soy Flour	15.0000	20.0000	300.0000
Sugar	12.0000	30.0000	360.0000
Ammonium Bicarbonate	15.0000	2.0000	30.0000
Sodium Bicarbonate	20.0000	1.0000	20.0000
Yeast	100.0000	0.5000	50.0000
Color	3000.0000	0.0500	150.0000
Orange Flavor	400.0000	1.0000	400.0000
Salt	3.0000	2.0000	6.0000
Vitamin Premix	1300.0000	0.4500	585.0000
Fat	25.0000	20.0000	500.0000
Total		377.0000	4561.0000
Net Yield		85%	
Projected Total Finished Product by Kg		319.2000	
Projected Packet Count @ .05kg/packet		6384.0000	
Total Cartons @ .05kg Packets (48/carton)		133.0000	
Projected Packet Count @ .04kg/packet		7980.0000	
Total Cartons @ .04kg Packets (60/carton)		133.0000	
Projected Ingredient Cost Per .04kg Packet		0.5716	
Packaging		Per Package Costs	
BOPP (5900 wrappers) - 6 kg pkg	135.0000	0.0229	
Carton - one carton	6.5000	0.1083	
Sealing Tape - one roll	30.0000	0.0041	
Packaging Subtotal	0.1353	0.1353	
Ingredient Costs	0.5716		
Total Material Costs	0.7068		
Overhead @ 12%	0.0848		
Production Costs Using 12%	0.7917		
Overhead @ 24%	0.1696		
Production Costs Using 24%	0.8765		

2. PAYMENTS

The payments category breakdowns displayed on the following spreadsheet are those chosen by Temitope. They include: preliminary expenses, fixed assets, staff training, advertising, raw materials, packaging materials, salaries/wages, and factory costs. It is understood that the WINS project will only reimburse a portion of the costs that Temitope has and will continue to incur in this weaning food venture.

Projected Cash Flow for Initial Twelve Months													40% Production						
	1	2	3	4	5	6	7	8	9	10	11	12	TOTAL	13	14	15	16		
SALES							287,280	287,280	287,280	287,280	287,280	287,280	1,723,680	574,560	574,560	574,560	574,560		
EXPENSES																			
Preliminary Research and Development Costs						Test Sales/Marketing Begins in Month 6													
Initial Registration of Product	7,500												7,500						
Initial Trial Production and Laboratory Tests	3,425												3,425						
Analyst Certificate	3,500												3,500						
Artwork	2,800												2,800						
Market Survey	5,975												5,975						
Factory Sanitation	8,500												8,500						
Uniforms	14,400												14,400						
Grinder Modification	13,500												13,500						
Packaging Machine Modification	28,000												28,000						
Sagroom Renovation	28,700												28,700						
Motor Vehicle Repair	77,650												77,650						
Expense Credit	(24,000)												(24,000)						
TOTAL PRE PRODUCTION COSTS	169,750	0	0	0	0	0	0	0	0	0	0	0	169,750	0	0	0	0		
Staff Training						6,250	6,250	6,250	6,250	6,250	6,250	6,250	50,000	6,250	6,250	6,250	6,250		
Advertising	41,000						20,000	20,000	20,000	20,000	20,000	20,000	20,000	201,000	20,000	20,000	20,000	20,000	
Expense Credit	(3,750)	(3,750)		(17,750)	(15,750)	(12,000)							(53,000)						
Raw Materials	42,250					136,841	136,841	136,841	136,841	136,841	136,841	273,682	1,136,978	273,682	273,682	273,682	273,682		
Expense Credit			(26,000)											(26,000)					
Packing Materials	44,950					32,391	32,391	32,391	32,391	32,391	32,391	64,782	304,077	64,782	64,782	64,782	64,782		
Expense Credit	(10,000)			(40,000)											(50,000)				
Overhead at 12%	(1,200)	10,464	(3,120)	(4,800)	0	20,308	20,308	20,308	20,308	20,308	20,308	40,616	163,807	40,616	40,616	40,616	40,616		

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Projected Cash Flow for Initial Twelve Months														40% Production			
	1	2	3	4	5	6	7	8	9	10	11	12	TOTAL	13	14	15	16
Overhead at 12%, decreasing by 1% monthly	0	9,592	(2,600)	0	0	11,846	10,154	8,462	6,769	5,077	3,383	3,383	56,069	3,385	3,385	3,385	3,385
TOTAL MATERIAL COSTS	(11,200)	107,256	(31,720)	(44,800)	0	201,386	199,694	198,001	196,309	194,617	192,924	382,464	1,584,931	382,464	382,464	382,464	382,464
PERSONNEL																	
Plant Operators					3,720	3,720	3,720	3,720	3,720	3,720	3,720	7,440	33,480	7,440	7,440	7,440	7,440
Packers					4,960	4,960	4,960	4,960	4,960	4,960	4,960	9,920	44,640	9,920	9,920	9,920	9,920
Electrical Engineer	1,860	1,860	1,860	1,860	1,860	1,860	1,860	1,860	1,860	1,860	1,860	3,720	24,180	3,720	3,720	3,720	3,720
Mechanical Engineer	1,860	1,860	1,860	1,860	1,860	1,860	1,860	1,860	1,860	1,860	1,860	3,720	24,180	3,720	3,720	3,720	3,720
Quality Controller	900	900	900	900	900	900	900	900	900	900	900	1,800	11,700	1,800	1,800	1,800	1,800
Sales Manager-Marketing		2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	4,000	24,000	4,000	4,000	4,000	4,000
Marketing Canvassers (2)		2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	4,000	24,000	4,000	4,000	4,000	4,000
TOTAL PERSONNEL	4,620	8,620	8,620	8,620	17,300	17,300	17,300	17,300	17,300	17,300	17,300	34,600	186,180	34,600	34,600	34,600	34,600
TOTAL MACHINING						630	630	4,990	4,990	4,990	4,990	5,620	26,840	5,620	5,620	5,620	5,620
GRAND TOTAL ALL EXPENSES	200,620	115,876	(26,850)	(53,930)	27,800	233,566	243,874	246,541	244,849	243,157	241,464	448,934	2,165,901	422,684	422,684	422,684	422,684
TOTAL INCOME	0	0	0	0	0	0	287,280	287,280	287,280	287,280	287,280	287,280	1,723,680	574,560	574,560	574,560	574,560
TOTAL EXPENSE	200,620	115,876	(26,850)	(53,930)	27,800	233,566	243,874	246,541	244,849	243,157	241,464	448,934	2,165,901	422,684	422,684	422,684	422,684
VARIANCE SURPLUS (DEFICIT)	(200,620)	(115,876)	26,850	53,930	(27,800)	(233,566)	43,406	40,739	42,431	44,123	45,816	(161,654)	(442,221)	151,876	151,876	151,876	151,876
BALANCE TO DATE	(200,620)	(316,496)	(289,646)	(235,716)	(261,516)	(497,082)	(453,676)	(412,937)	(370,506)	(326,382)	(280,567)	(442,221)		(290,345)	(138,469)	13,407	165,283

Sales is based upon 30 batches being produced each month (30 batches of 7,980 packets each sold at 1.2 per packet). Initial months (first twelve) show level of production at 20% of factory capacity.

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